

Atlantic Richfield Company

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November 13, 2009

Ms. Nadia Hollan Burke
Remedial Project Manager
U.S. Environmental Protection Agency - Region 9
75 Hawthorne Street, SFD-8-2
San Francisco, California 94105

Subject: Responses to EPA October 30, 2009 Comments on the Draft VLT Characterization Work Plan Using X-Ray Fluorescence, Yerington Mine Site and the Submittal of the Revised XRF Work Plan dated November 16, 2009; Administrative Order on Consent and Settlement Agreement for Removal Action and Past Response Costs, EPA Region 9 Docket No. 09-2009-0010

Dear Ms. Hollan Burke:

Atlantic Richfield Company (ARC) has prepared the attached responses to comments on the Draft VLT Characterization Work Plan Using X-Ray Fluorescence (XRF Work Plan) dated October 30, 2009. Comments were provided to ARC by the U.S. Environmental Protection Agency - Region 9 (EPA) on October 30, 2009. Further discussion on the Draft XRF Work Plan between ARC and EPA occurred during a teleconference on November 5, 2009. The attached responses and revised XRF Work Plan dated November 16, 2009 reflect the written comments and the discussion (e.g., collection of additional samples at depths up to 3 feet below ground surface; greater specificity on XRF detection limits and calibration and operational procedures).

ARC recognizes that the implementation of the XRF screening program during the removal action will require close coordination with the selected contractor to achieve the goals of the screening program. We look forward to discussing the results of the initial VLT sampling and XRF measurement program with EPA in order to achieve those goals.

In addition to preparing hard copies for EPA and the copied recipients below, the Revised VLT Characterization Work Plan has been uploaded to the Tetra Tech/EPA Anaconda Document Library (SharePoint Partners Website <https://partners.ttemi.com/sites/epanevada/default.aspx>) in the public folder entitled Revised VLT Characterization Work Plan. If you have any questions regarding ARC's attached responses to EPA comments on the Draft VLT Characterization Work Plan, please contact me at (714) 228-6774 or via e-mail (jack.oman@bp.com).

Sincerely,



Jack Oman
Project Manager

A BP affiliated company



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XRF Work Plan Responses to Comments
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**ARC RESPONSES TO EPA COMMENTS DATED OCTOBER 20, 2009 ON THE DRAFT VLT CHARACTERIZATION WORK PLAN USING
X-RAY FLUORESCENCE (XRF WORK PLAN) DATED SEPTEMBER 16, 2009, YERINGTON MINE SITE**

Comment Number	Section	COMMENTS
1	General	ARC states “The Draft Design Work Plan describes the VLT covers for the LEP, UEP, Thumb Pond and Sub Area A as having an average thickness of 18 inches. To limit potential accumulations of poor quality water within the LEP, additional VLT fill materials will be placed in low-lying areas of the LEP to contain excess soil moisture.”
		During the August 6, 2009 meeting, precipitation (5.12 inches annually) and evaporation (assumed to be ~45 inches annually) data referenced/used by ARC to calculate soil moisture plus PET versus percolation plus infiltration (e.g. VLT storage capacity) were requested. What is the status of providing these data to EPA for review?
		ARC Response: The information requested in this comment was provided to EPA in the <i>Draft Implementation Work Plan for the Anaconda Evaporation Pond Removal Action</i>.
2	General	In several instances, ARC refers to the VLT material as soil. The VLT is not soil and references throughout the work plan should accurately identify the materials being screened/sampled as VLT.
		ARC Response: As requested, the attached XRF Work Plan has been revised to replace all references to soil with VLT.
3	General	Provide an updated list of references for data and information discussed but not included in this report.
		ARC Response: The attached XRF Work Plan has been revised to include a list of references covering cited documents, EPA analytical methods, and data sources.
4	Work Plan Objectives	In addition to developing a correlation between field XRF and laboratory results, the work plan objectives should include the provision of methods to sample the VLT material as the removal action progresses so that unacceptable VLT material is not used as cover material. EPA acknowledges that the degree of correlation between laboratory and field XRF results will affect the number of necessary XRF samples during the removal action, but this work plan should include development of the screening criteria and a procedure for sampling for comparison to those criteria during the removal action. In particular, some discussion should be included to indicate how screening will be accomplished for metals that show poor correlation between XRF and laboratory analysis.

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		<p>ARC Response:</p> <p>To minimize potential interferences that can introduce unwanted errors into the XRF measurements, which could reduce the correlation between XRF and laboratory analytical results, ARC has eliminated in-situ measurements. Per the discussion with EPA on November 5, 2009, the attached XRF Work Plan has been revised to: 1) focus solely on intrusive field screening; and 2) discuss the potential interferences responsible for errors and the procedures that will be implemented to minimize errors (e.g., drying of VLT sample materials, removal of the largest particles and homogenizing of the sample prior to taking measurements). The revised text also includes the manufacturer's anticipated detection limits for metals measurements using FPXRF.</p> <p>Correlation between XRF and laboratory analytical results, screening criteria for use during the removal action, and procedures for addressing sample results relative to screening criteria during the removal action, will be presented in the XRF data summary report (DSR). Because data that will be used for these determinations have not yet been collected, their inclusion in the XRF Work Plan is not appropriate, as discussed on November 5, 2009.</p>
5	VLT Sample Locations	<p>In order to provide a range of possible metal concentrations from the VLT piles, the samples should come from depth ranges consistent with the proposed excavation depths for VLT borrow material. Surface soil samples will not alone cover this range. In addition samples should be selected to provide a range of visually different material such as red versus yellow material.</p>
		<p>ARC Response:</p> <p>As agreed during the November 5, 2009 discussion, the attached XRF Work Plan has been revised to indicate that surface and subsurface samples of VLT material will be collected at each location. Surface samples will be collected from the upper six inches of the VLT pile, and subsurface samples will be collected from a depth of 2 to 3 feet below the surface using a hand auger and/or shovel. In addition, should visually different materials (i.e., red versus yellow) be encountered, a sample of the visually different material will also be collected for characterization (non-duplicate).</p>
6	In Situ Field Screening	<p>Raw data before averaging should be recorded and provided so that the variability can be assessed.</p>
		<p>ARC Response:</p> <p>The attached XRF Work Plan has been revised to indicate that all raw data (i.e., the four individual XRF measurements to be taken for each sample) will be recorded on the field form and provided to EPA in the DSR.</p>

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7	FPXRF Instrument and Comparability with Laboratory Results	<p>ARC proposes FPXRF instrumentation using EPA Method 6200 and per previous agreement with EPA. The stated objective of the XRF Work Plan is to “determine the correlation of metal concentrations obtained during field screening of VLT materials using a FPXRF instrument with the analytical results for VLT samples obtained from the project laboratory for a subset of the metals presented in Table 2”. This objective is likely not achievable using FPXRF given ARC’s subsequent statement “...ARC anticipates that the correlation between low concentration results will have a high degree of uncertainty and, for a number of metals, no correlation will be possible.” Has ARC looked at other XRF instrumentation (e.g. EDXRF) in an effort to achieve lower detection limits and satisfy the stated objective of the work plan?</p> <p>Additional details of the statistical comparison of XRF and laboratory data should be provided, including discussion of how results for metals that show a poor fit between the two methods will be used in decision making. The standard approach for demonstrating comparability is achieving a high r^2 value in a least squares linear regression analysis. It is recommended that standard approaches for identifying and possibly eliminating outliers also be employed, as anomalous results can confound interpretation of the relationship between methods. In order to perform reliable comparisons to established action levels, it is necessary to demonstrate strong association between methods, which in most cases would also include calculating appropriate laboratory-equivalent concentrations for the XRF data using results from the linear regression analysis.</p>
		<p>ARC Response:</p> <p>The Innov-X hand-held XRF proposed for field screening of the VLT material is an energy dispersive XRF (EDXRF) instrument. This instrument was specifically selected with the intent of achieving the lowest detection limits obtainable from a hand-held FPXRF to satisfy the stated objective of the XRF Work Plan. Further, every effort will be made to minimize potential interference effects described in EPA Method 6200 that can introduce variability into the XRF measurements. The attached XRF Work Plan has been revised to describe potential interference effects and proposed steps that will be taken to minimize their impact.</p> <p>As discussed on November 5, 2009, the details of statistical comparisons between XRF measurements and laboratory analytical results will be addressed in the XRF DSR rather than in the XRF Work Plan. As suggested by EPA, these comparisons will include linear regression analysis. However, if the data indicate that other methods of statistical comparisons would be appropriate or useful, ARC will seek EPA concurrence on application of other methods at that time. Throughout the evaluation process, careful consideration will be given to identifying and eliminating outliers to maximize the correlation between XRF and laboratory data achieved through the statistical comparisons.</p>

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8	Field Screening Procedures	Although EPA Method 6200 was included as an attachment to the work plan, the work plan does not specifically state that the EPA method 6200 will be used. For example the work plan does not provide procedures for drying or homogenizing samples prior to analysis, which are included in the EPA method 6200.
		<p>ARC Response:</p> <p>The last sentence in the fourth paragraph on page 2 of the draft XRF Work Plan states that “ARC and EPA have agreed that a field-portable x-ray fluorescence (FPXRF) instrument will be used in accordance with EPA Method 6200 (Attachment 1)” However, for further clarification, the attached XRF Work Plan has been revised to describe field screening procedures and quality control measures based on the descriptions presented in EPA Method 6200 (e.g., potential interference effects that could introduce measurement errors and procedures to minimize these errors including drying and homogenizing samples prior to taking XRF measurements).</p>
9	Field Screening Procedures	It is stated that “Field screening of VLT materials using the FPXRF will be performed as both in situ and intrusive measurements at each sample location. The in situ mode involves the direct measurement of undisturbed soil, and the intrusive mode involves the collection and preparation of the soil sample before measurement.” If the results between in-situ field screening and intrusive field screening are in disagreement, how will these disagreements be resolved?
		<p>ARC Response:</p> <p>As agreed during the November 5, 2009 discussion, the attached XRF Work Plan has been revised to indicate that only the intrusive measurement approach will be performed because this approach is less susceptible to potential interference effects than the in-situ method.</p>
10	Soil Sampling Procedures	Because results of duplicate soil metal analysis can vary considerably from sample heterogeneity, EPA suggests that duplicate laboratory analysis be conducted on at least half of the samples.
		<p>ARC Response:</p> <p>As agreed during the November 5, 2009 discussion, the existing QA approach (duplicate analyses on 20% of the samples) is sufficient to address variability in analytical results attributable to potential sample heterogeneity. In addition, the attached XRF Work Plan has been revised to include more information on sample preparation, shipping, chain-of-custody.</p>

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11	Instrument Blank Samples	If blank contamination is observed, what action is taken?
		<p>ARC Response:</p> <p>If QC measurements indicate the presence of blank contamination, the FPXRF instrument window and the instrument blank disc will be checked for contamination and cleaned in accordance with the manufacturer's recommendations. After cleaning, the instrument will be "zeroed" in accordance with manufacturer instructions. This is the procedure described in the XRF Work Plan and in EPA Method 6200. However, the Work Plan discussion of <u>Instrument Blank Samples</u> will be expanded to indicate that the procedure conforms to Method 6200.</p>
12	Precision Measurements	What corrective action will be taken if the RSD is above a specified criterion?
		<p>ARC Response:</p> <p>If during field screening RSD results exceed a specified criterion for individual metals, this variation will be noted in the field log but specific corrective action will not be implemented at that time. Any such RSD deviations will be evaluated during subsequent correlation of XRF and laboratory analytical results, and will be discussed in the correlation portion of the XRF DSR. Correlation of XRF and laboratory results will include evaluation of data using box and whisker plots, as well as identification and elimination of outliers from data correlations.</p>